

Plexiform neurofibroma of the tongue: a case report of a child

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A three-year-old girl with a lingual plexiform neurofibroma treated by total excision is presented. Despite their occurrence in the head and neck region, neural sheath tumors are rarely encountered in the oral cavity. It is reported that 4-7% of patients affected by neurofibromatosis display oral manifestations. Neurofibromatosis is characterized by café-au-lait spots and cutaneous neurofibromas. Plexiform neurofibroma is said to be indicative of von Recklinghausen's disease (VRD) even though it may be the only manifestation of the disease. Generally, surgical resection represents the treatment of choice and the diagnosis can only be confirmed after histological examination. Affected patients need regular follow-up to detect malignant degeneration, an early recurrence or appearance of other manifestations of VRD.

Key words: plexiform neurofibroma, tongue, child, von Recklinghausen, schwannoma, neurofibroma.

There are two types of nerve sheath tumors originating from the peripheral nerves: schwannoma (neurilemoma) and neurofibroma¹. Neurofibromas are the hallmark of neurofibromatosis, also known as von Recklinghausen's disease (VRD)². The difference between a neurofibroma and schwannoma is histological and it is important to differentiate between them because the former has a potential for malignant transformation^{1,2}.

In this paper a case of neurofibroma of the tongue was reported due to the rarity of this pathology and the presence of significant symptoms such as café au lait spots and dermal neurofibromas.

Case Report

A three-year-old girl presented to our department with a history of a slowly growing painless mass involving the tongue which was present since birth. Her parents complained of a disturbance of mastication and phonation but denied any disturbance of respiration; there was no history of bleeding. Oral cavity examination revealed a pinkish red swelling with an irregular surface

involving the left side of the mobile tongue. The swelling, which was clearly evident on inspection, was 4x5 cm in size and was soft, nontender, nonreducible and nonpulsatile on palpation. There was also a brown nodular mass of 0.5 cm in diameter on the antitragus of the left auricula. A brown macular lesion 3 cm in diameter was found on the left anterior side of her neck. Routine laboratory tests were within normal limits. Magnetic resonance imaging (MRI) disclosed a hypervascular mass in the tongue which was consistent with a lymphangioma or hemangioma (Fig. 1).

Surgical Findings

The patient underwent surgical removal of the mass under general anesthesia. The mass was non-encapsulated. It was infiltrating deep into the intrinsic tongue muscles and a poor cleavage plane was present between the lesion and these muscles. The mass was excised totally by preserving the lingual mucosa which was trimmed and rotated into the wound bed during closure. Neither a cranial nerve trunk nor a

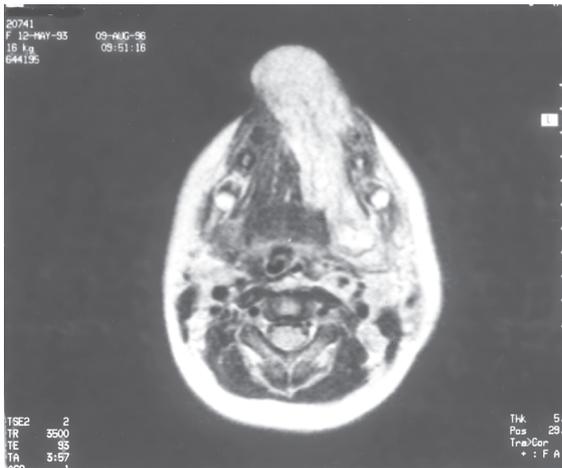


Fig. 1. Preoperative non-contrast T₂-weighted magnetic resonance images of the patient. Note protrusion of the tongue from oral cavity, which was causing failure in feeding, mastication and articulation as well as a poor cosmetic appearance.

main vascular structure was seen in the surgical field. However, there was a plethora of abnormal vessels, which were bleeding excessively when incised. The postoperative period was uneventful and the motor functions and sensation of the tongue were normal as well.

Histopathological examination revealed a neoplasm composed of enlarged and tortuous peripheral nerve branches underlying lingual mucosa and spilling out into the muscular tissue of the tongue. The neural structures were expanded owing to increased endoneural myxoid ground substance (Figs. 2, 3). The neural cells were positive for S-100 protein. The diagnosis was plexiform neurofibroma.

Retrospectively, the patient was investigated for other manifestations of VRD. MRI scan of the brain and temporal bone was performed and

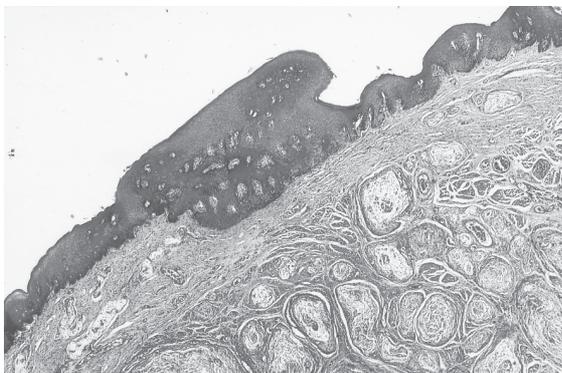


Fig. 2. Submucosal plexiform neural structures (H&E, original magnification x4).

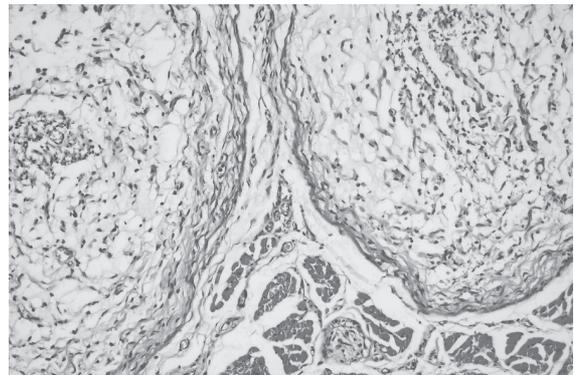


Fig. 3. Plexiform neural structures with increased endoneural myxoid ground substance within the muscle tissue of tongue (H&E, original magnification x40).

no other lesions were noted. Audiometric tests including auditory brainstem response (ABR) were within normal limits. No evidence of Lisch nodules was noted on eye examination by an ophthalmologist. The patient was followed up for a period of seven years with no sign of recurrence.

Discussion

Neurofibromatosis is a disease entity that includes two distinct variants that differ from each other genetically, histologically and clinically³. Neurofibromatosis type-1 (NF-1), often known as VRD, is one of the most common autosomal dominant inherited disorders, with an incidence of 1 in 3,000⁴. The extremely wide range of manifestations of this neurocutaneous disorder predisposes the patient to increased morbidity and mortality⁵. The NF-1 gene is a large complex, the mutation of which gives rise to diverse manifestations in terms of gene organization and expression⁶. The protein encoded by this gene (neurofibromin) is expressed in many different tissues and acts as a GTPase activator; its absence leads to severe developmental abnormalities⁷. However, neurofibromatosis type-2 (NF-2), also known as central neurofibromatosis, is an autosomal dominant disease which accounts for an extremely small percentage of the total cases of NF. The hallmark of NF-2 is the presence of bilateral vestibular schwannomas^{3,8}.

Neurofibromas of the large nerves, which appear clinically as soft, drooping and doughy masses⁹, are benign neoplasms composed of neurites, Schwann's cells, and fibroblasts within a collagenous or myxoid matrix¹⁰. In contrast

to schwannomas, they are nonencapsulated and engulf the nerve of origin. Plexiform neurofibromas, forming tortuous cords along the segments and branches of a nerve with a tendency to grow centripedally, are poorly circumscribed tumors¹⁰. This tumor is said to be indicative of VRD even though it may be the only manifestation of the disease^{11,12}. Neurofibromas, usually associated with VRD, are generally encountered as multiple lesions, and rarely occur as a solitary tumor, as in our case. However, the plexiform neurofibroma is rarely encountered in NF-2 and rapid growth of a plexiform neurofibroma usually suggests transformation into a neurofibrosarcoma⁹.

Despite their occurrence in the head and neck region, neural sheath tumors are rarely seen in the oral cavity. Only 4-7% of patients affected by neurofibromatosis display oral manifestations¹³. The mobile tongue is the most commonly involved site followed by buccal mucosa, floor of the mouth, palate, lips and gingiva¹⁴. Peron et al.¹⁵ reported a series of 13 neural tumors of the tongue in which there were two neurofibromas, and one malignant and five benign schwannomas. The base of the tongue is a relatively rare location and tumors in this region may lead to an upper airway obstruction¹⁶.

Since neurofibromas are usually multiple lesions, the whole body must be investigated as well as larynx and trachea in such a patient with oral neurofibroma, since lesions in the upper airway may cause respiratory obstruction. Yamada et al.¹⁷ reported a seven-month-old infant who presented with respiratory distress and a sublingual mass. The patient died due to respiratory failure and autopsy revealed laryngeal submucous plexiform neurofibromatous nodules as well as extensive plexiform neurofibromas involving the vagal, recurrent laryngeal, and phrenic nerves. In our patient, we did not encounter any lesion in the upper airway.

Differential diagnosis of such a tongue mass in childhood must include neurofibroma, schwannoma (neurilemoma)¹⁵, lymphangioma¹⁸, cavernous hemangioma, hamartoma, teratoma¹⁹, lipoma²⁰, myofibroma and myofibromatosis²¹, leiomyoma²², cystadenoma²³, pyogenic granuloma²⁴, nerve sheath myxoma²⁵, congenital granular cell tumor²⁶, and cystic lesions such as

mucoïd cysts²⁷, dermoid cysts²⁸, and cysts of foregut origin²⁹. The treatment of such lesions is generally surgical and the diagnosis can only be confirmed after histological examination¹. The family members of the index case should also be examined, since intragenic microsatellite markers were reported to be highly informative for familial neurofibromatosis in Turkish families³⁰.

It is important to differentiate a neurofibroma from a schwannoma histopathologically, since von Recklinghausen's neurofibromatosis-associated neurofibroma has greater potential for malignant transformation, which was reported to be between 5-16%^{1,14}.

Neurofibromas have extensive vascularity and tend to bleed during surgery. Therefore, excessive bleeding should be kept in mind while attempting surgical removal. In our patient, despite a poor cleavage plane and bleeding, we were able to accomplish total extirpation of the lesion preserving the surrounding tongue tissue. The resection bed was primarily reconstructed using preserved muscle and mucosa of the tongue. In this way, functional disabilities of the patient such as poor oral feeding, drooling, disturbed mastication and articulation were minimized despite a considerable amount of tongue reduction. The result was a much better cosmetic appearance enabling the patient to close her mouth (Fig. 4).

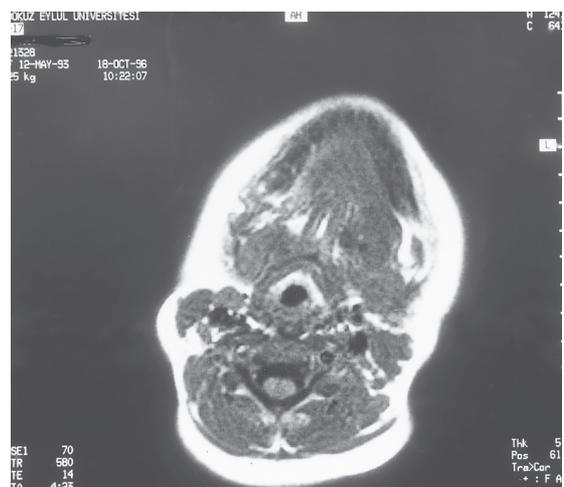


Fig. 4. Postoperative non-contrast T₁-weighted magnetic resonance images of the patient. The tongue withdrew into oral cavity after the operation. Failure in feeding, mastication and articulation was managed successfully and an improved cosmetic appearance was obtained.

Early diagnosis in such a patient is very important and these patients need regular follow-up during their lifetime to detect recurrences and appearance of other manifestations of VRD, especially central nervous system tumors (namely acoustic schwannomas and optic nerve gliomas)⁸. Fortunately, there were no signs of recurrence or other manifestations of VRD during the seven-year follow-up period of our patient.

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